

INDIVIDUAL EXECUTIVE CHARACTERISTICS AND FIRM PERFORMANCE:  
EVIDENCE FROM CEO NARCISSISM

by

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A DISSERTATION

Presented to the Department of Accounting  
and the Graduate School of the University of Oregon  
in partial fulfillment of the requirements  
for the degree of  
Doctor of Philosophy

June 2017

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## DISSERTATION ABSTRACT

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June 2017

Title: Individual Executive Characteristics and Firm Performance: Evidence from CEO Narcissism

Narcissism refers to persistent feelings of grandiosity, a need for admiration, and a lack of empathy (American Psychiatric Association 2013). The literature has found narcissism to be associated with individuals making decisions for a firm that fulfill their egos rather than maximize firm value. The literature in psychology, however, suggests that when firms face financial distress, narcissism could be a desirable trait in an individual, enabling the CEO to take the necessary risks and make the necessary decisions for the firm to recover. I study the context under which a firm may benefit from a narcissistic CEO. In this study, I use two measures from prior literature (CEO photo prominence in the annual report and a CEO's use of first-person personal pronouns) to form a combination measure to investigate whether firms in financial distress are more likely to appoint a CEO with more narcissistic traits. I find some evidence to support this hypothesis. I also examine whether the association between narcissism and future firm performance is affected by the economic conditions of a firm and the visibility of the firm. I find results consistent with firm financial distress increasing a narcissistic CEO's effect on firm performance in low-visibility firms.

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## ACKNOWLEDGMENTS

I thank my dissertation committee chair, Steve Matsunaga, for his continued guidance. I thank the other members of my dissertation committee for their valuable insight and comments: Angie Davis, Dane Christensen, and Trudy Cameron. I also thank Kyle Peterson for his assistance with Python coding for the data collection phase of this project. I acknowledge financial support from the Lundquist College of Business, the AICPA Foundation, and the KPMG Foundation.

This dissertation is dedicated to my friends and family, for their loving support; to my mother, for her unrelenting strength and words of wisdom; and to my late father, who instilled in me the value of education at a very young age, and who continues to guide me today.



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# **CHAPTER I**

## **INTRODUCTION**

Narcissism is a personality disorder generally defined as “a pattern of grandiosity, need for admiration, and lack of empathy” by the American Psychiatric Association (APA) (2013). Extant research shows that narcissism in executives has potentially negative effects on firms, such as a higher degree of earnings management and inflated performance, weaker internal controls, higher probability of misstatements, resistance and opposition to their firm’s directors’ experiences when deciding on firm’s corporate strategy, and higher compensation due to their influence on the board (Frino, Lim, Mollica, and Palumbo 2015; Ham, Lang, Seybert, and Wang 2015; Hales, Hobson, and Resutek 2012; Zhu and Chen 2015; O’Reilly, Doerr, Caldwell, and Chatman 2014). In contrast, Olsen, Dworkis, and Young (2014) find that firms with narcissistic CEOs have higher EPS and share price than those with non-narcissistic CEOs, and they attribute this performance to real and operational activities rather than accruals. The literature has studied narcissism of CEOs in general. In this paper, however, I examine the specific contexts that may affect the relationship between narcissism of a CEO and firm performance.

The literature in psychology suggests that under certain conditions, narcissism could be a desirable trait in leaders. For example, in their historical review of narcissistic leadership, Rosenthal and Pittinsky (2006) state that narcissists thrive in times that call for a new order to be established and that the confidence and dominance of a narcissistic individual can inspire “ideal-hungry” followers. Similarly, Maccoby (2000) states that narcissistic leaders may thrive in chaotic times but may seem out of place in more

tranquil times. Nevicka, De Hoogh, Van Vianen, and Ten Velden (2013) find that individuals choose narcissistic leaders, in spite of being aware of their negative traits, in the face of high uncertainty about the business environment. This occurs when a company is in difficulty, the company's share price has plummeted, the company has lost market share, the company has an unpredictable work environment, and employees feel a sense of stress spreading through the organization. Further, the literature finds that the relationship between narcissism and performance quality is affected by the opportunity for self-enhancement, that is, whether the performance of the task is public or evaluated by others (Wallace and Baumeister 2002).

Altogether, the literature suggests that narcissism may be favorable in some conditions and not in others. In particular, the literature suggests that it is likely to be most desirable in cases of high distress and high visibility of a firm. I expect a firm in financial distress to benefit from hiring a narcissistic CEO for several reasons. First, financial distress induces risk-taking in a firm (Kliger and Tsur 2011; Fiegenbaum 1989; Fiegenbaum and Thomas 1988) and individuals with narcissistic traits are more likely to take these risks (Maccoby 2000; Foster, Shenese, and Goff 2009; Foster, Misra, and Reidy 2009; Lakey, Rose, Campbell, and Goodie 2008). Second, narcissistic individuals, by definition, have fantasies of unlimited success and are more likely to outperform non-narcissistic individuals in situations in which the task is thought to be difficult (Wallace and Baumeister 2002). Third, individuals with narcissistic traits tend to move quickly (Aktas, de Bodt, Bollaert, and Roll 2016), and without the need or desire for oversight or approval (APA 2013; Zhu and Chen 2015), traits that would be desirable in a sinking firm, given the urgency in the firm's financial state, and the need for speedy

implementation of recovery strategies. Evidence in Fee, Hadlock, and Pierce (2013) suggests that boards of directors anticipate the causal effects of replacement CEOs and their individual characteristics. Thus, I expect and predict that boards foresee the effects of a CEO with narcissistic qualities on their particular firm and that boards of firms in financial distress are more likely to appoint a narcissistic CEO.

I then examine the effect of narcissism of the CEO on firm performance under conditions of distress and firm visibility. Firms in distress would benefit from appointing a narcissistic CEO for the reasons described above. Additionally, literature suggests that narcissistic leaders thrive when they perceive an opportunity for self-enhancement (Wallace and Baumeister 2002), which would be provided by a highly visible firm. Therefore, in my second set of tests, I predict that the distressed firms who appoint a high-narcissism-scoring CEO will experience better, short-term future performance relative to the distressed firms that did not appoint a CEO with narcissistic traits and that the relationship between narcissism and firm performance is affected by firm visibility.<sup>1</sup>

My analysis focuses on CEO successions in the Standard and Poor's Execucomp database for the period 2007-2013. Finkelstein, Hambrick, and Canella's (2009) "fit-drift/shift-refit" theory argues that the environment under which a firm operates may change such that the current CEO does not fit the current needs of the firm. CEO turnover provides an opportunity for the board to re-align the needs of the firm with the skills of the CEO. Thus, I use CEO turnover as my sample setting to explore whether the board of directors matches individual CEO characteristics to the firm's current economic situation.

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<sup>1</sup> I rely on the assumption that there are instances in which firms mismatch their appointed CEOs to the needs of the firm, that is, that a firm in financial distress does not hire a narcissist or that a firm not in financial distress hires a narcissist. This assumption is consistent with the turnover literature (Chen and Hambrick 2012; Finkelstein et al. 2009; Khurana 2002).

Over the sample time period, I identified 684 and 824 usable CEO turnover observations using only a photo measure or only a speech measure of narcissism, respectively, and 549 observations using a combined score of these two measures. I find evidence that firms with decreasing debt-service ratios are more likely to appoint a CEO with a higher narcissism score. However, I do not find this same result using the Altman Z-Score measure of distress. The mixed results suggest a firm's board of directors may be focusing on a firm's immediate, short-term operational needs (captured by the debt-service ratio), but not on longer-term indicators of financial health that are captured by the Altman Z-Score of a firm. The results could also be due to the recognized limitations of the Altman Z-Score, i.e., that it may not fully capture and/or correct for the increase in firm leverage and R&D of firms over time (Begley, Ming, Watts 1996; Franzen, Rodgers, and Simin 2007), which may reduce its ability to predict bankruptcy, as discussed in more detail below.

In my next set of tests, I explore whether the appointment of a CEO with narcissistic traits for firms under distress is followed by an increase in firm performance relative to firms not under distress that hire these types of CEOs or firms under distress that do not appoint this type of individual. I do not find evidence that firms with CEOs with high narcissism scores have increased future aggregate performance as levels of distress increase. In my third set of tests, I find that in low-visibility firms, narcissism on its own improves future performance. Further, narcissism increased future firm performance when interacted with firm distress. This result is inconsistent with my third hypothesis, which predicts that the performance should improve more for firms that are highly visible. I interpret this result to suggest that when a firm is highly visible, a

narcissistic individual may be too focused on his or her visibility, and thus, not focused on the effort in his work, while an individual with high narcissistic tendencies in a low-visibility firm will not be distracted by the limelight and as such, will improve a distressed firm's performance. Overall, the evidence in my tests supports the psychology literature that suggests narcissistic leaders thrive in times of uncertainty and with task difficulty. However, my findings are inconsistent with the psychology literature that suggests narcissists outperform non-narcissists when they sense an opportunity for self-enhancement.

My study adds to the accounting literature on upper-echelons theory, which explores the importance of individual CEO characteristics on firm outcomes (Hambrick 2007). Understanding the relationship between narcissism and firm performance is important to accounting given that prior research has shown significant individual CEO effects on firm operational, disclosure, and reporting policies and strategies (Davis, Ge, Matsumoto, and Zhang 2015; Dejong and Ling 2013; Demerjian, Lev, and McVay 2012; Graham, Li, and Qui 2012; Baik, Farber, and Lee 2011; Ge, Matsumoto, and Zhang 2011; Bertrand and Schoar 2003). My study contributes specifically to the accounting and finance literature that explores similar characteristics, such as overconfidence and hubris, on firm outcomes (Humphery-Jenner, Lisic, Nanda, and Silveri 2016; Hribar and Yang 2015; Hirshliefer, Low, and Teoh 2012; Malmendier, Tate, and Yan 2011; Malmendier and Tate 2008; Malmendier and Tate 2005). I add to this vein of research by looking at narcissism as a CEO characteristic, a more ingrained and fundamental individual trait. Narcissism and performance have been studied in general, but I examine moderating factors that play into this relationship, specifically, firm distress and firm

visibility. Understanding the conditional relationship of narcissism and performance under firm distress and firm visibility can lay the foundation for later examining the effects of this type of individual on the accounting decisions of a firm, such as on accrual choices, financial reporting and disclosure, and tax decisions, which themselves vary under different conditions of distress and visibility.

This study is subject to several limitations. First, as with all studies that focus on voluntary behavior of firms, it is difficult to draw causal inferences from the results. In the first set of tests (the determinants tests), it is possible that a correlated and omitted variable is affecting both a firm's state of financial distress and the firm's decision to hire an individual with narcissistic traits as CEO. The tests examining the effect of narcissism on firm performance are also subject to concerns of endogeneity and self-selection. I attempt to address these concerns in a couple different ways. First, I use a lead-lag approach (Dhaliwal, Li, Tsang, Yang 2011; Christensen 2016) in my analysis and look at prior year distress and its effect on the current year CEO appointment, given that the contemporaneous relationship between CEO narcissism and firm distress could be ambiguous. Second, I examine the appointment decision and its effect on future performance and include year and industry fixed-effects in my models, to rule out the possibility that a correlated omitted variable persistent in a given year or in a given industry is driving the results. Even with these procedures, endogeneity and self-selection bias issues cannot be entirely ruled out. Despite these limitations, however, this study provides some interesting insights into the CEO selection process and how CEO narcissism may affect firm outcomes.



## **CHAPTER II**

### **LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

The primary premise of upper echelons theory is that individual characteristics of executives—shaped by their experiences, values, and personalities—influence the decisions they make for a firm (Hambrick 2007; Hambrick and Mason 1984). Consistent with this view, the literature has found significant manager fixed-effects on firm policies and firm outcomes. Bertrand and Schoar (2003) find that individual managers affect a firm's investment policies (as measured by capital expenditures, investment to Tobin's Q and cash flow sensitivity, and the number of acquisitions), financing policies (leverage, interest coverage, cash holdings, and dividends to earnings), and operational strategy and performance (R&D, advertising, SG&A, ROA, and operating ROA). More recently, Baik et al. (2011) measure CEO ability using press citations, manager-specific efficiency (with Demerjian et al.'s (2012) measure of revenue-generating efficiency), and industry-adjusted ROA during the CEO's tenure. They find that CEO-specific ability is positively related to the frequency and accuracy of earnings forecasts, and that the market is more responsive to high-ability CEOs' forecasts. Graham et al. (2012) show that unobservable manager fixed-effects explain a majority of variation in executive compensation.

In the accounting literature, individual characteristics of executives have been found to have a significant effect earnings quality, voluntary disclosure, tax avoidance, and firm performance. Ge et al. (2011) add CFO fixed-effects to a base model and find CFO-specific effects on accounting choices such as discretionary accruals, meeting or beating analysts' expectations, earnings smoothing, and the likelihood of an accounting misstatement. Demerjian, Lev, Lewis, and McVay (2013) find that the manager-specific

portion of firm efficiency (that is, the portion of a firm's sales relative to certain inputs attributable to the individual manager) is associated with fewer restatements, higher earnings and accruals persistence, lower errors in the bad-debt provision, and higher accruals quality. In their study exploring individual executives and accruals, Dejong and Ling (2013) find that accruals are directly affected by an individual's personal operating style. Davis et al. (2015) also find manager-specific effects associated with when they begin their careers, whether they are involved in charitable organizations, and their banking and consulting experience, on the optimistic tone of conference calls. Bamber, Jiang, and Wang (2010) find that managers' disclosure styles (such as frequency, precision, and bias of disclosures) are influenced by demographic characteristics of these managers, such as professional background, age, military experience, or education. Firm tax avoidance, as measured by Cash and GAAP effective tax rates, is also found to be affected by individual executives (Dyreng, Hanlon, and Maydew 2010), which Francis, Sun, and Wu (2013) attribute to managerial ability.

More specifically related to this paper, the literature has explored the impact of executive hubris and overconfidence on firm outcomes. Using option- and press-based proxies for overconfidence, Hribar and Yang (2015) find that overconfidence of CEOs increases the likelihood of issuing earnings forecasts and also increases the optimism and precision of those forecasts. Using the same overconfidence measures, Humphery-Jenner et al. (2016) find that overconfident CEOs receive more incentive-based compensation to exploit their positively biased views of the firm. Hirshliefer et al. (2012) find that firms with overconfident CEOs have greater return volatility, invest more in innovation, obtain more patents and patent citations, and achieve greater innovative success for given levels

of R&D, but that these results occur only in innovative industries. From a stakeholder perspective, Tang et al. (2015) find that CEOs who are perceived by the media as overconfident, or “hubristic,” engage in less socially responsible firm activities and more socially irresponsible firm activities (as measured by KLD data categories). The authors attribute this finding to the CEOs’ underestimation of firm dependence on stakeholders for resources and support due to their overestimation of their own capabilities and self-sufficiency. Other studies have found that executive overconfidence is related to financing decisions of the firm (these firms issue less equity), overpayment for target companies and pursuit of value-destroying M&As, and to over-investing when internal funds are readily available (Malmendier et al. 2011; Malmendier and Tate 2008; Malmendier and Tate 2005).

In this paper, I examine a related, but fundamentally different managerial trait—narcissism. Narcissistic Personality Disorder (NPD) describes an enduring, pervasive, and inflexible pattern of behavior that deviates from cultural norms. Specifically, to meet the clinical definition of NPD according to the American Psychiatric Association (APA), an individual must exhibit a consistent “pattern of grandiosity (in fantasy or behavior), need for admiration, and lack of empathy” (APA 2013). Individuals popularly considered to be narcissists are not necessarily clinically diagnosed as having NPD. However, these individuals often exhibit personality traits that are consistent with the clinical definition of NPD. As is common in the literature, I thus focus on the idea of sub-clinical narcissism, that is, on individuals who exhibit NPD traits.

As discussed above, the previous literature has examined overconfidence and hubris (defined as exaggerated or extreme overconfidence), characteristics of executives

that are often conceptually associated with the trait of narcissism. Hayward and Hambrick (1997) note that extreme confidence or hubris can be a result of external stimuli, such as recent performance, but as Chatterjee and Hambrick (2007) summarize, “narcissism is the more fundamental, ingrained property,” not reliant on past performance. Further, the APA (2013) describes one of the elements of narcissism to be an expectation of being recognized as superior without the commensurate achievements. Narcissists place a high importance on how they are perceived by others, and want to manage and enhance this perception. Raskin, Novacek, and Hogan (1991) describe narcissism having a defensive competitive element, such that a narcissist has a high need for external approval. At the same time, narcissists lack empathy and do not recognize or identify with the feelings and needs of others (APA 2013). Thus, high self-esteem, overconfidence, and hubris differ from narcissism in that they lack these additional elements. These differences are important for this study because they create different implications for firm performance, particularly under the conditions of firm distress and firm visibility, as discussed in more detail below.

In the popular press and in every-day discourse, narcissism is used in a primarily negative sense. Several academic studies have found negative effects of narcissism in leaders. Hornett and Fredricks’ (2005) case study analyzes individual perceptions of several corporate executives who were in the news for ethical transgressions or criminal actions during that time. They report that several of these “fallen leaders” have a narcissistic quality that led these individuals to work for themselves, rather than work toward achieving corporate goals. Ongoing studies show that narcissism is associated with earnings manipulation, as measured by abnormal discretionary accruals, abnormal

discretionary expenses, abnormal cash flows from operations, and abnormal production costs incurred (Frino et al. 2015; Ham et al. 2015); inflated performance, as measured by GMAT scores in an experimental setting (Hales et al. 2012); less timely loss recognition, as measured by conditional accounting conservatism (differential timeliness of good versus bad news); weaker internal controls, as measured by ineffective internal controls and number of internal control weaknesses; and a higher probability of accounting restatements (Ham et al. 2015). Zhu and Chen (2015) find that narcissistic CEOs (measured by a 4-trait index) resist the influence of other directors' prior experience and tend to adopt corporate strategies that are opposite of what fellow directors' prior experience would suggest. From a market perspective, Aktas et al. (2016) look at CEOs of M&A firms and find that acquirer shareholders react less favorably to a takeover announcement if the target firm CEO is more narcissistic. Further, they find that narcissism of CEOs leads to lower probability of deal completion. Finally, O'Reilly et al. (2014) posit and find that narcissistic CEOs extract higher levels of compensation and have larger spreads between their own compensation and the compensation of other executives.

On the other hand, many traits exhibited by narcissists overlap with those of good, strong leaders, such as high self-confidence, strategic vision for the future, and charisma. Thus, a firm under the leadership of a narcissist may experience positive outcomes. Some of the literature is consistent with this notion. In the context of M&As, Aktas et al. (2016) find that narcissistic CEOs initiate acquisitions and negotiate faster. In the same context, Chatterjee and Hambrick (2007) find that narcissism in CEOs is positively related to the number and size of acquisitions and firm performance (shareholder returns and ROA).

Olsen et al. (2014) find that firms with narcissistic CEOs have higher earnings per share (EPS) and a higher share price than firms with non-narcissistic CEOs.

Considering that some traits of narcissists and strong leaders overlap, and considering the evidence on the outcome effects of narcissists, it is not clear whether the appointment of a narcissistic CEO is necessarily a bad choice for the firm. In their review of the literature on narcissism in organizational contexts, Campbell, Hoffman, Campbell, and Marchisio (2011) stress that much of the research attempts to answer the question of whether narcissism is good or bad, but they suggest that researchers should instead explore the conditions under which narcissistic leaders thrive and the various outcomes of their leadership in those particular conditions. In their review paper, Rosenthal and Pittinsky (2006) pose the question of whether findings in the narcissism literature point to optimal conditions of the success of narcissistic leaders. They state they would expect narcissists to thrive in times that call for a new order to be established. Similarly, Maccoby (2000) states that narcissistic leaders may thrive in chaotic times and may seem out of place in more tranquil times. In their experimental study, Nevicka et al. (2013) find that even in instances when individuals are aware of the negative features of narcissistic leaders, they choose them as leaders anyway if times are uncertain, that is, if the company's environment is one in which the company is in difficulty, the share price has plummeted, the company has lost market share, has an unpredictable work environment, and employees feel a sense of stress spreading through the organization.

Based on evidence in the prior literature, a firm under financial distress may benefit from appointing a narcissistic leader. First, prospect theory suggests that individuals are not uniformly risk averse. In the negative domain—that is, in times of

losses and uncertainty—individuals are risk-seeking (Kahneman and Tversky 1979). The management and finance literatures have translated this idea into corporate contexts, and have found empirical evidence that financial distress induces risk-taking. Several studies find that firms with below-average or below-median returns take on more risk than firms with high returns (Kliger and Tsur 2011; Fiegenbaum 1990; Fiegenbaum and Thomas 1988). The general notion is that risk-taking is appealing to individuals who have varying risk preferences in firms under financial distress because they have little else to lose. Thus, firms in distress benefit from the risk-taking. Adding to the above, the empirical literature supports a positive link between narcissism and risk-taking.<sup>2</sup> As Maccoby (2000) states, “Productive narcissists [are] risk takers willing to get the job done...” Additionally, Bandiera, Guiso, Prat, and Sadun (2015) show that firms select managers based on those managers’ risk preferences.

Second, one of the defining characteristics of a narcissist is a “grandiose sense of self-importance (e.g., exaggerates achievements and talents...)” and a preoccupation “with fantasies of unlimited success...” (APA 2013). Thus, a narcissistic individual would not be one to shy away from a leadership role in a failing firm out of fear that he or she is not qualified to fix the firm’s problems—a narcissist may even be drawn to these particular firms. Supporting this idea, an experiment by Wallace and Baumeister (2002) finds that individuals with high narcissism scores perform best when task success is thought to be difficult to achieve, but perform relatively poorly when task success is thought to be unchallenging. Thus, a narcissistic individual could be drawn to the leadership role in a distressed firm. Furthermore, he or she may actually perform better in this firm than in a

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<sup>2</sup> See Foster, Shenese, and Goff (2009); Foster, Misra, and Reidy (2009); Lakey, Rose, Campbell, and Goodie (2008); and Britt and Garrity (2006).

non-distressed firm where the task is not challenging. Therefore a distressed firm could benefit from this type of individual.

Third, a firm in distress would likely benefit from a fast-acting individual given the urgency of its financial state. The study by Aktas et al. (2016) makes a link between narcissism and the ability to act quickly by showing that higher levels of CEO narcissism are associated with a shorter takeover process length in M&A activity. Furthermore, a narcissist, by definition, lacks empathy and is unwilling to recognize the feelings and needs of others (APA 2013). Thus, a narcissistic CEO coming into his or her role in a financially distressed firm would not feel the need to cooperate with members of the board or other executives to begin to implement the changes he or she believes are necessary for the firm. An individual who is able to empathize may find it necessary to take a more deliberative approach to his or her decision-making by meeting with other governing individuals within a firm and achieving a consensus. Thus, an empathetic manager may not move quickly enough for a failing firm. Consistent with this argument, Zhu and Chen (2015) find that relatively narcissistic CEOs strongly resist the influence of other directors and may even adopt corporate strategies that are the opposite of what the prior experience of other directors would suggest for the firm. Additionally, a narcissistic CEO may be allowed to act quickly without oversight, given his or her charismatic nature. Maccoby (2000) describes narcissistic leaders as having “personal magnetism and [the] ability to stir enthusiasm among audiences.” Campbell and Campbell (2009) describe the benefits of narcissistic leadership as occurring in the “emerging zone” of leadership, that is, in the stages during which a person is becoming a leader, involving unacquainted individuals, early-stage relationships, and short-term contexts. The authors



use prior literature's link between narcissism and charisma (Deluga 1997) as supportive of their own findings with respect to this emerging leadership setting.

Based on the above, I predict that the board of directors matches a troubled firm's needs to the particular skills of a CEO having traits consistent with narcissism. I formalize this prediction with the following hypothesis:

**H1:** *The likelihood that a firm will hire a high-narcissism-scoring CEO is positively associated with firm's financial distress in the prior year.*

As a natural extension to H1, I expect that firms under distress that appoint this type of individual will experience the benefits of the choice, as the literature suggests. This leads to my next hypothesis:

**H2:** *Appointment of a high-narcissism-scoring CEO by financially distressed firms is associated with a subsequent improvement in firm performance.*

The narcissism literature has attributed the mixed results regarding performance of narcissistic leaders to other potentially missing moderating variables. Wallace and Baumeister (2002) argue that the missing element is the "opportunity for glory" or a self-enhancement opportunity. In their four-part experiment, they posit and find that the relationship between narcissism and performance quality is moderated by the opportunity for self-enhancement and that narcissists actually seem to perform below their abilities when the goal is not self-enhancing. They describe a task as more self-enhancing when the performance of the task is visible to the public or when performance is evaluated by others, provided that the narcissist values the opinions of those he or she perceives to be observing his or her performance. In the corporate realm, a firm with high visibility

would offer this opportunity for self-enhancement to a CEO. Thus, my final hypothesis is as follows:

***H3:*** *Firm performance under a high-narcissism-scoring CEO is positively associated with firm visibility.*

## **CHAPTER III**

### **RESEARCH SETTING AND SAMPLE SELECTION**

Fee et al. (2013) argue that because of the endogeneity of any change in top management, the fixed-effects approach in many previous studies makes it difficult to determine whether idiosyncrasies of individual managers play a causal role in a firm's selections. In fact, in a sample of exogenous CEO transitions (death, declining health, or natural retirement), they find no evidence of changes in firm policies or performance. They suggest that random and unobservable managerial traits do not explain variation in policy, but rather that the board anticipates the needs of the firm at the time of turnover and selects specific managers to fit those needs. These findings are consistent with Finkelstein et al.'s (2009) "fit-drift/shift-refit" theory, which posits that as the conditions of the firm change over time, the current executive's skills becomes less suited to the firm. When a board has the opportunity to select a new executive, it can re-align the current needs of a firm with the skills of the new executive. Supporting this theory, Chen and Hambrick (2012) find that while CEO replacement, in and of itself, has no real effect on firm performance, troubled firms perform better when the newly appointed CEOs are well-matched to the current conditions of the firm. Thus, the particular setting of CEO succession provides an opportunity for researchers to examine the conditions of the firm and how the board matches the needs of the firm to the skills of the individual appointed as a new CEO.

I begin my sample selection with all CEO turnovers from the Execucomp database of S&P 1500 firms. First, given data collection costs, I restrict my sample to the

years 2007-2013.<sup>3</sup> Further, a majority of corporations keep annual reports (a necessary element for one of the narcissism measures discussed below) on their websites only for the most recent ten years. The sample period ends in 2013 to allow for assessment of the firm's subsequent performance. The sample window is large enough to include periods of both economic expansion and economic recession, allowing my tests to span potentially different distress environments for firms. For a turnover observation to be valid, I require that both the outgoing and incoming CEO are present for at least two consecutive years. I also require that the incoming CEO takes on his or her role as CEO immediately after the outgoing CEO's departure. These requirements remove any temporary assignments of CEOs and allow me to study the effects of the CEO chosen by the board. I obtain financial data from the Compustat database and data on media mentions and transcripts of earnings conference calls from the Factiva database.

The primary proxy used to measure narcissism in the psychology literature is the Narcissism Personality Inventory (NPI), which is a standard survey consisting of questions regarding behaviors, traits, and other personality characteristics that an individual answers for him- or herself, to reveal whether the individual can be deemed narcissistic (Emmons 1984). Given the difficult and sensitive nature of collecting this type of survey from individuals, researchers have developed other, more unobtrusive methods by which to collect narcissism measures (mainly, non-participant observation). Chatterjee and Hambrick (2007) develop and validate an index of narcissism using

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<sup>3</sup> Data collection for the photo score measure includes obtaining individual annual reports for each firm from a firm's website or a third-party website, searching for the shareholder letter and observing the CEO's photo in the shareholder letter to assign a score. Data collection for the speech measure includes downloading earnings conference call transcripts for the relevant period for each observation from the Factiva database.

unobtrusive and observable indicators and then map these indicators into the four conceptual elements of the NPI. The literature has since used variations of their index (Aktas et al. 2016; Olsen et al. 2014; Zhu and Chen 2015; and Chatterjee and Hambrick 2011). In this paper, I follow the prior literature and use the prominence of the CEO's photograph in the annual report and the ratio of singular personal pronouns to all personal pronouns used by the CEO in the Q&A section of the firm's conference call as my two primary measures of narcissism. I then combine the two measures, described in detail below, to form a single empirical index of the degree of CEO narcissism.

The first measure of narcissism I use is the prominence of the CEO's photograph in the firm's annual report. Anecdotal evidence lends support to the idea that both the photograph and the shareholder letter in the annual report are greatly under the control of the CEO (Chatterjee and Hambrick 2007) and can be used as a way for this individual to showcase himself or herself, catering to the CEO's vanity, self-absorption, and sense of entitlement. For each valid CEO turnover observation, I review the annual reports found on each company's website to identify the CEO's photograph.<sup>4</sup> I follow Olsen et al. (2014) to assign a "CEO photograph prominence" score to each annual report appearance. The categorizations are as follows:

- (1) No photograph of the CEO is provided<sup>5</sup>
- (2) The CEO is photographed with other executives or board members

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<sup>4</sup> A CEO's picture is generally located in the "Letter to Shareholders" portion of the annual report. In several instances, the shareholder letter is not located in the annual report, and is instead either located as a stand-alone document or as part of a separate report called an "Annual Review." I reviewed a company's website for whichever document held the annual letter to shareholders from the CEO.

<sup>5</sup> Some firms do not provide an annual report through their website, and as such, only the SEC-required 10-K is available. The 10-K follows a specific format, does not contain stylistic elements, and does not typically contain a Letter to Shareholders. Rather than categorize these cases as having no photograph of the CEO (1), I remove these observations altogether.

- (3) The CEO is photographed alone, and the photograph takes up less than half of the page
- (4) The CEO is photographed alone, and the photograph takes up at least half of the page, with text taking up some space on the page
- (5) The CEO is photographed alone, and the photograph takes up the entire page

I collect the photo prominence score for 3 years: the first year a new CEO appears in the annual report as CEO (year  $t$ ), and the two years after (years  $t+1$  and  $t+2$ ). It could be the case that in the first year a new CEO appears in the company's annual report, the company is intentionally prominently displaying the CEO's photo with a public relations motive, and thus, in the first appearance, the photo may not necessarily reflect the CEO's preference for how he or she is pictured. Therefore, I do not use the first appearance of a CEO (year  $t$ ), and instead take an average of the scores for the second and third photos (*pic\_avg*). I also construct one photo score for the outgoing CEO from the year preceding the CEO turnover, for use in building "change" variables.

The second measure of narcissism is the CEO's use of first-person, singular pronouns. This measure captures a narcissistic individual's sense of superiority and exploitativeness by capturing how he or she takes credit for what might not be solely a personal achievement. The literature has found that individual manager characteristics affect conference call tone (Davis et al. 2015), that a manager's vocal cues are informative to analysts on conference calls (Mayew and Venkatachalam 2012), and that individual executives exhibit linguistic features that are predictive of financial restatements and accounting problems during conference calls. Thus, the conference calls

reflect individual traits of the executives who are speaking. Therefore, for this measure, I first collected two analyst conference call transcripts per turnover firm from the Factiva database (using the CQ FD Disclosure source): one from the year before the CEO turnover (where the outgoing CEO spoke) and one from a year after the CEO turnover (where the new CEO spoke). I then isolated the Q&A section of the conference call, and further isolated the portions of the Q&A section that represented only the CEO's words.<sup>6</sup> I counted the number of first-person singular pronouns (I, me, my, mine, I'm, I've, I'll, and I'd) and divided that number by the sum of those pronouns plus first-person plural pronouns (we, us, our, ours, we're, we've, we'll, and we'd). The final measure, therefore, is a ratio of singular first-person pronouns to all first-person pronouns (*pnoun\_ratio*). I use the incoming CEO's score minus the outgoing CEO's score for change variables.

I then combine the above two underlying constructs, picture score and speech score, to form a single measure of narcissism. Although using the combined measure reduces my sample and thus, reduces the power of my tests, I use the combined measure as my primary measure of narcissism for two main reasons. First, the combined measure captures more of the conceptual elements of narcissism than either one of the individual measures would alone. In particular, Emmons (1984) uses the questions in the Narcissistic Personality Inventory (which is used in psychology research as the primary measure of narcissism) to develop four conceptual factors of narcissism captured by those

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<sup>6</sup> Conference calls typically contain a Management Discussion (MD) portion and a Q&A portion. The MD portion is generally prepared in advance, or "scripted," whereas the Q&A is the interactive portion of the call, in which analysts and investors can ask questions of management, and is not always explicitly prepared in advance. While there is evidence that even the Q&A portion of conference calls may be scripted (Lee 2016), anything scripted would likely be related to content matter, and thus, the manner in which the content is communicated would still be influenced by a narcissist and reflect a narcissist's tendencies of speech. Thus, either section of the call could be a valid section of speech to construct my measures. However, due to its more spontaneous nature and thus, potential ability to capture personality traits, I choose to use the Q&A section.

questions. He labels these conceptual factors as: 1. Leadership/Authority, 2. Self-absorption/Self-admiration, 3. Superiority/Arrogance, and 4.

Exploitativeness/Entitlement. Chatterjee and Hambrick (2007) then develop an index of narcissism that uses unobtrusive and observable indicators to capture these four conceptual elements. No single indicator captures all four conceptual elements. The prominence of a CEO's photo captures the leadership/authority, self-absorption/self-admiration, and exploitativeness/entitlement elements, but not the superiority/arrogance element. The use of first-person, singular pronouns measure captures the leadership/authority, superiority/arrogance, and exploitativeness/entitlement elements, but not the self-absorption/self-admiration element. In fact, by looking ahead to Table 4, one sees that the individual measures are not significantly correlated. Together, however, the picture score and speech score may successfully capture all four conceptual elements of narcissism.

Second, the individual measures of narcissism may be noisy, or may be capturing something else about the firm. For example, as mentioned previously, the photo in the annual report may reflect the firm's desire to showcase the CEO, without necessarily reflecting his or her desire to showcase him- or herself. The photo may also be capturing the style of a particular firm's public relations department or the firm could simply be following the previous year's template. The speech score is more specific than the photo score, given that it measures the actual individual's way of speaking. However, there could still be measurement error, depending on the events that are being discussed in a conference call. For example, in a particular conference call, if the focus of an analyst's question is on the CEO herself for whatever reason, rather than on a firm event, then that



CEO's singular personal pronoun usage will be higher than it might be if she were discussing general financial results of the firm. A combined measure of narcissism would capture the overlap of these two measures and reduce some of the measurement error found in each individual measure use alone.

To create the combined measure, I first standardize the picture and speech scores described above. I then use the sum of the standardized scores to create a combined variable (*nar\_sum*). I also create a binary measure for this combined score (*nar\_bin*) which takes a value of one if the standardized picture and speech scores are both greater than 0, and zero otherwise. For my main tests, I use the combined measure of narcissism and discuss these tests and results more thoroughly. Additional analyses in Section V show results for the same tests using the individual parts of the combined measure.

A common element in prior studies' measure of narcissism is relative pay, typically measured as a CEO's cash and non-cash compensation relative to the next highest paid executive's cash and non-cash pay, respectively. It is true that a CEO may have influence over his own compensation and the compensation of the other top executives, as the results in O'Reilly et al. (2014) suggest. However, this measure relies on the assumption that the contracting environment is inefficient over time. The complexity of the environment for compensation contracting, as well as the confounding effects of the CEOs actual expertise, reduce the ability of the measure to capture narcissism of the CEO. Further, the results in O'Reilly et al. (2014) suggest that CEO tenure has a significant impact on the gap between a narcissistic CEO's pay and the pay of the other executives. Thus, in my turnover setting, compensation of the newly hired

executive may not reflect the effects of longer-term pay extraction. For these reasons, I choose not to use this measure in my construct of narcissism.

Table 1, Panel A provides descriptive statistics for the combined narcissism measure (*nar\_sum*), the picture score (*pic\_avg*), and the speech measure (*pnoun\_ratio*), as well as their binary, high-versus-low counterparts for the incoming CEOs. The combined binary score (*nar\_bin*) is measured as discussed above, with approximately 1/3 of the sample having a score of 1 (high narcissism scores). The variable *pic\_bin* takes a value of one if the picture score is greater than or equal to 3, and zero otherwise; *speech\_bin* takes a value of one if the ratio is higher than the mean, and zero otherwise. Prior studies that have used comparable measures for narcissism show similar values for the mean picture score and mean speech score. For example, Aktas et al. (2016) use the same measure (*pnoun\_ratio*) and report a mean of .215 for their sample of 146 CEOs. Chatterjee and Hambrick (2007) show a mean of .210 for this same measure on their sample of 111 CEOs. Both of these are slightly lower than my sample's mean of .239. For the picture score average, Chatterjee and Hambrick (2007) show a mean of 2.52 (n=111), Judd et al. (2015) show a mean score of 2.57 (n=972), and Olsen et al. (2014) show a mean of 2.79 (n=283), which are all slightly higher than the mean of my picture score (*pic\_avg*) of 2.37. Only one of these studies, Olsen et al. (2014), uses a binary measure of narcissism, and bases this indicator on a composite score of narcissism. They report a binary mean of .51, compared to the binary measure used in this paper (*nar\_bin*) of .29. This difference is not surprising, however, given that their binary measure takes a value of 1 if the composite score is higher than the average, while my binary measure

**Table 1**  
**Incoming CEO Narcissism Summary**

**Panel A: Descriptive Statistics for Narcissism Measures**

	N	mean	min	med	max
<i>nar_sum</i> (combined score)	549	0.043	-3.699	0.046	7.96
<i>nar_bin</i> (combined binary)	549	0.295	0	0	1
<i>pic_avg</i> (picture score)	684	2.371	1	3	5
<i>pic_bin</i> (picture binary)	684	0.537	0	1	1
<i>pnoun_ratio</i> (speech score)	824	0.239	0	0.233	1
<i>speech_bin</i> (speech binary)	824	0.473	0	0	1

**Panel B: Photo Score and Speech Score Breakdown for Incoming CEOs**

		Perce		<i>pnoun_</i>
<i>pic_avg</i>	Freq.	t	Cum.	<i>ratio</i>
1	143	26.05	26.05	0.236
1.5	9	1.64	27.69	0.235
2	64	11.66	39.34	0.241
2.5	31	5.65	44.99	0.206
3	250	45.54	90.53	0.248
3.5	27	4.92	95.45	0.211
4	14	2.55	98.00	0.257
4.5	1	0.18	98.18	0.281
			100.0	
5	10	1.82	0	0.264
Total	549	100.00		

**Panel C: Hiring Changes from Prior CEO to Incoming CEO**

	Combined Score		Picture Score		Speech Score	
	Freq.	Perce	Freq.	Percent	Freq.	Perce
1 to 0 (high narcissism to low)	81	14.75	102	14.91	185	22.45
0 (no change)	367	66.85	482	70.47	456	55.34
0 to 1 (low narcissism to high)	101	18.40	100	14.62	183	22.21
	549	100.00	684	100.00	824	100.00

This table presents summary information for the narcissism measures. For a turnover observation to be valid, I require the outgoing and incoming CEOs to be present for at least two years. Further, I require the incoming CEO to immediately replace the outgoing CEO. The scores in Panel A and B are for the incoming CEO (but require the availability of data for the outgoing CEO). All variables are defined in Appendix A.

takes a value of 1 if both the standardized picture score and standardized speech score are higher than their respective means.

Panel B of Table 1 breaks down the frequency of the photo scores for the 549 observations that have both a photo and speech score, and shows the average speech score (*pnoun\_ratio*) for each group of photo score observations. Panel C shows the turnover observations by whether the outgoing or incoming CEO is classified as a narcissist with the binary measures. Table 2 breaks down the sample into the Fama-French industries, showing a wide representation of industries, with the Finance and Business Equipment industries having the most turnovers.

**Table 2**  
**Sample Industry Breakout**

Industry Description		Observations with a Narcissism Score					
		<i>nar_sum</i>		<i>pic_avg</i>		<i>pnoun_ratio</i>	
		N	mean	N	mean	N	mean
1	Consumer NonDurables	31	0.045	37	2.432	46	0.216
2	Consumer Durables	14	0.895	19	2.632	24	0.264
3	Manufacturing	80	0.005	95	2.426	96	0.227
4	Oil, Gas, and Coal Extraction and Products	31	0.177	37	2.500	37	0.246
5	Chemicals and Allied Products	18	0.412	23	2.826	21	0.216
6	Business Equipment	82	0.001	89	2.253	145	0.251
7	Telephone and Television Transmission	6	-1.699	10	1.950	12	0.174
8	Utilities	29	0.052	47	2.830	36	0.203
9	Wholesale, Retail, and Some Services	62	-0.689	79	1.943	100	0.221
10	Healthcare, Medical Equipment, and Drugs	30	0.080	36	2.375	66	0.239
11	Finance	107	0.254	141	2.390	143	0.256
	Other -- Mines, Constr, BldMt, Trans,						
12	Hotel, Bus Serv, Entertainment	59	0.310	71	2.324	98	0.254
		549	0.043	684	2.371	824	0.239

This table presents the sample frequency by Fama-French industries for each measure of narcissism. All variables are defined in Appendix A.

Table 3 presents summary statistics and tests the differences between the variable means and medians between the groups of firms that appointed a CEO with a high

narcissism score and the firms that did not. Panel A shows the groups split by the combined-score binary measure, Panel B splits them by the picture binary measure, and Panel C groups them using the speech binary measure. In all panels, the firm's distress variables (z-score and debt-service ratio) do not differ significantly between the two groups, which could be due to the variables being measured at year t, the year of CEO appointment, and not at year t-1 or t-2, when it would be expected for distress of the firms to significantly differ between the two groups. All panels show significant differences in mean or median or both for visibility, as measured by media mentions, suggesting either that high-scoring CEOs may find themselves in more visible firms or that the media is drawn to such CEOs. Further, the significant differences in market value, EPS, income, operating income, and ROA in Panels A and B between the groups seem to point to a relationship consistent with narcissism of a CEO being positive for firm performance, consistent with Olsen et al. (2014). Panel C shows less-pronounced differences in several of the variables, but still shows significant differences in market value and market-to-book means, leverage medians, and capital expenditure means and medians.

Table 4 shows the Pearson correlation between all variables. This table shows us that the two narcissism measures are not significantly correlated. As discussed in more detail above, this is likely because they capture different conceptual elements of narcissism. There is not a significant correlation between the narcissism measures and the z-score or debt-service ratio, which is not surprising given that my hypotheses do not predict a direct relationship between narcissism and distress, but rather predict that their

**Table 3**  
**Summary Statistics**

**Panel A: Comparison Using Combined Measure of Narcissism**

	<i>nar_</i> <i>bin = 1</i> mean	<i>nar_</i> <i>bin = 0</i> mean		<i>nar_</i> <i>bin = 1</i> median	<i>nar_</i> <i>bin = 0</i> median	
<i>zscore</i>	-3.276	-3.680		-3.224	-3.130	
<i>debt_serv</i>	-28.793	-82.146		-3.994	-3.863	
<i>media_pre</i>	342.559	265.506		136.000	107.000	**
<i>at</i>	36052.044	20119.695		3979.291	3074.743	***
<i>mkvalt</i>	11819.948	7444.666	**	3515.385	2120.586	***
<i>eps_pi</i>	1.877	1.520		1.750	1.510	
<i>ib</i>	712.715	373.752	***	166.190	92.004	***
<i>ebitda</i>	1755.834	1194.931	*	515.491	316.717	***
<i>ROA</i>	0.127	0.129		0.130	0.120	
<i>mtb</i>	2.153	3.007	**	1.808	1.849	
<i>levg</i>	0.233	0.240		0.187	0.220	
<i>rd_ratio</i>	0.022	0.020		0.000	0.000	
<i>capex_ratio</i>	0.039	0.046		0.025	0.030	

**Panel B: Comparison Using Picture Measure of Narcissism**

	<i>pic_</i> <i>bin = 1</i> mean	<i>pic_</i> <i>bin = 0</i> mean		<i>pic_</i> <i>bin = 1</i> median	<i>pic_</i> <i>bin = 0</i> median	
<i>zscore</i>	-3.659	-3.601		-3.190	-2.990	
<i>debt_serv</i>	-54.737	-65.577		-3.605	-3.539	
<i>media_pre</i>	385.514	254.129	***	129.500	100.000	***
<i>at</i>	40272.534	15859.726	**	4118.969	2712.817	***
<i>mkvalt</i>	15188.704	6067.531	***	3190.400	1805.397	***
<i>eps_pi</i>	1.900	1.416	**	1.795	1.400	**
<i>ib</i>	830.562	287.147	***	164.919	78.720	***
<i>ebitda</i>	2435.430	963.387	***	493.300	253.408	***
<i>ROA</i>	0.135	0.116	**	0.130	0.112	**
<i>mtb</i>	2.435	2.630		1.787	1.742	
<i>levg</i>	0.234	0.240		0.208	0.203	
<i>rd_ratio</i>	0.018	0.022		0.000	0.000	
<i>capex_ratio</i>	0.047	0.040	*	0.034	0.024	**

**Panel C: Comparison Using Speech Measure of Narcissism**

	<i>speech_bin</i> = 1 mean	<i>speech_bin</i> = 0 mean		<i>speech_bin</i> = 1 median	<i>speech_bin</i> = 0 median	
<i>zscore</i>	-3.248	-3.642		-3.107	-3.015	
<i>debt_serv</i>	-42.882	-79.588		-3.646	-3.913	
<i>media_pre</i>	327.445	239.664	*	117.000	101.500	*
<i>at</i>	26899.738	17009.707		2952.000	2606.943	
<i>mkvalt</i>	9968.797	6307.588	*	2175.096	1872.144	
<i>eps_pi</i>	1.135	1.275		1.140	1.380	
<i>ib</i>	430.172	263.303		87.097	75.304	
<i>ebitda</i>	1307.736	1064.350		327.638	269.398	
<i>ROA</i>	0.117	0.125		0.116	0.117	
<i>mtb</i>	2.372	3.041	**	1.805	1.789	
<i>levg</i>	0.235	0.247		0.177	0.228	**
<i>rd_ratio</i>	0.026	0.026		0.000	0.000	
<i>capex_ratio</i>	0.040	0.046	*	0.024	0.029	*

This table provides summary statistics for variables of interest, grouped by the narcissism measure binary, which takes a value of one if the standardized binary picture and speech scores equal 1, and zero otherwise (Panel A); takes a value of one if the appointed CEO's photo score is greater than or equal to 3, and zero otherwise (Panel B); or takes a value of one if the appointed CEO's pronoun ratio score is greater than the median, and zero otherwise (Panel C). P-values are in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. P-values for the differences in medians are calculated using the Wilcoxon rank-sum (Mann-Whitney) test. All variables are defined in Appendix A.

interaction affects firm performance. Table 4 also shows the combined measure and photo measure of narcissism significantly positively correlated to media mentions, consistent with high scoring narcissistic CEOs being drawn to highly visible firms, or drawing the media to their firms. The narcissism measure is also positively correlated with market value, EPS, net income, and operating income, consistent with Table 3 and with prior literature. The table also shows that while the z-score and debt-service ratio measures are positively and significantly correlated, the coefficient is only .17. This suggests that while both measures capture firm distress, they may be capturing different elements of firm distress.

**Table 4**  
**Variable Correlations**

	<i>nar_ sum</i>	<i>pic_ avg</i>	<i>pnoun_ ratio</i>	<i>zscore</i>	<i>debt_ serv</i>	<i>media_ pre</i>	<i>at</i>
<i>nar_sum</i>	1.00						
<i>pic_avg</i>	0.71 *	1.00					
<i>pnoun_ratio</i>	0.73 *	0.04	1.00				
<i>zscore</i>	0.02	0.01	0.02	1.00			
<i>debt_serv</i>	0.06	0.06	0.05	0.17 *	1.00		
<i>media_pre</i>	0.08 *	0.12 *	0.04	-0.01	0.04	1.00	
<i>at</i>	0.04	0.07 *	0.02	0.05	0.03	0.51 *	1.00
<i>mkvalt</i>	0.11 *	0.17 *	0.04	-0.05	0.04	0.82 *	0.39 *
<i>epspi</i>	0.12 *	0.17 *	0.00	-0.18 *	-0.02	0.33 *	0.09 *
<i>ib</i>	0.12 *	0.15 *	0.03	-0.06 *	0.02	0.53 *	0.05
<i>ebitda</i>	0.08 *	0.16 *	0.02	0.00	0.04	0.78 *	0.52 *
<i>ROA</i>	0.03	0.08 *	-0.04	-0.47 *	-0.17 *	0.04	-0.10 *
<i>mtb</i>	-0.10 *	-0.03	-0.03	-0.18 *	-0.03	0.02	-0.02
<i>levg</i>	-0.05	-0.01	-0.06 *	0.36 *	0.15 *	0.02	0.03
<i>rd_ratio</i>	-0.03	-0.05	-0.01	0.15 *	-0.05	0.01	-0.06 *
<i>capex_ratio</i>	-0.07 *	0.02	-0.09 *	0.03	-0.04	-0.02	-0.09 *

  

	<i>mkvalt</i>	<i>epspi</i>	<i>ib</i>	<i>ebit</i>	<i>ROA</i>	<i>mtb</i>	<i>capex_ ratio</i>
<i>mkvalt</i>	1.00						
<i>epspi</i>	0.41 *	1.00					
<i>ib</i>	0.90 *	0.50 *	1.00				
<i>ebitda</i>	0.86 *	0.39 *	0.71 *	1.00			
<i>ROA</i>	0.12 *	0.32 *	0.14 *	0.08 *	1.00		
<i>mtb</i>	0.03	0.10 *	0.03	0.00	0.28 *	1.00	
<i>levg</i>	-0.01	-0.12 *	-0.08 *	0.03	0.02	-0.06 *	
<i>rd_ratio</i>	-0.01	-0.08 *	-0.02	-0.04	-0.17 *	-0.01	
<i>capex_ratio</i>	0.01	0.07 *	0.03	0.01	0.26 *	0.00	1.00

This table provides the Pearson correlations among variables of interest. \* next to the correlation coefficient indicates that the correlation is statistically significant at least at the 10% level. All variables are defined in Appendix A.



## CHAPTER IV

### EMPIRICAL RESULTS

#### Predicting the Appointment of a CEO with Narcissistic Traits

I use the following Probit model to explore whether firms in distress are more likely to appoint a CEO with narcissistic qualities:

$$\text{Prob}(\text{HireNarCEO}) = \beta_0 + \beta_1 \text{Distress} + \beta_2 \text{Performance} + \beta_3 \text{MTB} + \beta_4 \text{RDExp} \\ + \beta_5 \text{CapitalExpenditures} + \sum \beta \text{IndustryD} + \varepsilon \quad (1)$$

In equation (1), the dependent variable, *HireNarCEO*, is measured with the combined narcissism binary score as described above. I use two different measures for my variable of interest, Distress: Altman Z-Score (*zscore*) (Altman 1968) and the firm's debt-service ratio (*debt\_serv*). The Altman Z-Score is widely used in the finance and accounting literature as a predictor of firm bankruptcy and a proxy for financial distress (e.g., Dichev 1998; Holder-Webb and Wilkins 2000; Piotroski 2000; and Eisdorfer 2008). The measure uses several ratios of accounting and stock market information to assign a z-score to each firm, where a lower z-score indicates higher financial distress.<sup>7</sup> The z-score of a firm focuses on long-term viability of a firm. The measure is not without its limitations, however. Begley, Ming, and Watts (1996) note that since the measure was developed, there has been increasing acceptance of high levels of corporate debt, such that a small reduction in debt has a smaller effect on the likelihood of bankruptcy than it did in the past. They continue to say that over time, a firm's liquidity has increased in importance. Similarly, the z-score has been criticized for distorting a firm's financial health because of increased R&D in firms (Franzen, Rodgers, and Simin 2007) and

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<sup>7</sup> Altman (1968) Z-score is calculated as  $1.2 * (\text{working capital}/\text{total assets}) + 1.4 * (\text{retained earnings}/\text{total assets}) + 3.3 * (\text{ebit}/\text{total assets}) + 0.6 * (\text{market value of equity}/\text{total liabilities}) + 0.999 * (\text{sales}/\text{total assets})$ .

downward-biased asset valuations of current accounting rules (Hillegeist, Keating, Cram and Lundstedt 2004).

Given the limitations of the z-score, I also use the debt-service ratio of a firm, calculated as earnings before interest, taxes, depreciation, and amortization (EBITDA) over the sum of total short-term debt and interest. The debt-service ratio is a simpler measure that captures the firm's ability to meet its current debt obligations, and as such, has a shorter-term focus which serves as an indicator of a firm's more immediate trouble. Wu, Gaunt, and Gray (2010) analyze several measures of financial distress used in the literature and how they predict bankruptcy for an updated sample of firms, i.e., firms from a more recent period. They conclude that firms are more likely to experience bankruptcy if they have relatively lower profitability (earnings before interest and taxes to total assets), lower liquidity, and higher leverage, which are all elements captured by the debt-service ratio. To more easily interpret the coefficients on the distress variables, I take the negative value of the z-score and debt-service ratio, such that the value of the resulting variable increases with distress. H1 predicts the coefficient on the distress variable to be positive and significant.

There is limited empirical evidence on the determinants of hiring a narcissistic CEO. Therefore, I include general firm control variables that often affect firm decisions and firm phenomena. I include financial performance (*ROA*) and expected growth (*mtb*) to capture current and future firm profitability. I also include R&D expenditures (*rd\_ratio*) and capital expenditures (*capex\_ratio*) to capture firm investment practices. Independent variables are measured as change variables from year t-2 to t-1 (where t is the appointment year). I also run the regressions with prior year levels of the independent

variables, and with both changes and prior year levels, under the assumption that changes in a firm's level of distress would affect a firm differently for firms with currently low or already-high levels of distress. All variables are defined in detail in the Appendix.

It may be the case that the opportunity for self-enhancement, or specifically firm visibility, attracts narcissistic individuals. These individuals will change the makeup of the applicant pool for highly visible firms, which would then increase the likelihood that highly visible firms will hire narcissistic individuals. I do not rule out this possibility. However, given that the appointment decision is with the board of directors, it is not clear how the visibility of the firm alone would, ex-ante, drive the board to appoint a narcissistic individual as CEO. For this reason, I do not formally model visibility as a determinant of the appointment decision.

Table 5 reports the results of Probit regressions for specifications based on Equation (1). Columns 1 and 2 are models where the narcissism indicator is regressed on the changes variables, columns 3 and 4 are regressions using prior year levels as variables of interest, and columns 5 and 6 use both changes and prior year levels of variables. In column 2, there is a positive and significant coefficient on the change in debt-service ratio variable, suggesting that an increase in firm distress in the prior two years increases the likelihood that the firms will hire a CEO with narcissistic traits. Column 6 shows the same result for the change in the debt-service ratio, after controlling for the prior year levels of distress. This finding is consistent with hypothesis 1. There is no significant coefficient on the z-score variable in either set of columns. The mixed results in Table 5 suggest that the distress variables, the z-score and the debt-service ratio, are capturing different elements of the firm's financial health, such that firms with a declining ability to

meet short-term debt obligations are more likely to benefit from a CEO with narcissistic traits than firms with decreasing long-term viability. Overall, the results in Table 5 partially support hypothesis 1.

## **Post-Appointment Performance**

### ***Post-Appointment Performance under Financial Distress***

Hypothesis 2 predicts that firms in distress that hire a narcissistic CEO will experience an improvement in future financial performance. To test this hypothesis, I use the following OLS regression model:

$$\begin{aligned} FuturePerformance = & \gamma_0 + \gamma_1 Narcissism + \gamma_2 Distress + \gamma_3 Narcissism * Distress \\ & + \gamma_4 l\_ROA + \gamma_5 lnat + \gamma_6 mtb + \gamma_7 levg + \sum \gamma IndustryD \\ & + \sum \gamma YearD + \varepsilon \end{aligned} \quad (2)$$

I measure *FuturePerformance* first as the change in performance from year t-1 to the future aggregate ROA for years t+1 and t+2 (measured as the sum of EBITDA in year t+1, and t+2 divided by the average total assets for the two years). I also use the aggregate measure of ROA to measure future performance, and I control for prior year ROA in this specification. I use operating income (EBITDA) as my measure of performance, using the assumption that short-term actions of an incoming CEO would likely include cutting costs and operating expenses, rather than including revenues or accounts related to longer-term strategy, such as long-term investments. This assumption is consistent with Olsen et al. (2014) who find that CEOs who score high on narcissism affect future firm performance through real and operational activities. *Narcissism* is measured with the combined narcissism continuous variable (*nar\_sum*) as described above. *Distress* is measured as in Equation (1), with either the Altman Z-Score (*zscore*)

**Table 5**  
**Probit Regression for Appointment Decision**

VARIABLES	Pred	(1) <i>nar_bin</i>	(2) <i>nar_bin</i>	(3) <i>nar_bin</i>	(4) <i>nar_bin</i>	(5) <i>nar_bin</i>	(6) <i>nar_bin</i>
<i>chg_zscore</i>	+	<b>-0.002</b> (-0.04)				<b>-0.003</b> (-0.05)	
<i>chg_debt_serv</i>	+		<b>0.001*</b> (1.87)				<b>0.001*</b> (1.95)
<i>chg_ROA</i>	?	-0.182 (-0.14)	0.431 (0.36)			-0.600 (-0.42)	0.226 (0.17)
<i>chg_mtb</i>	?	0.000 (0.11)	-0.000 (-0.08)			-0.005 (-0.68)	-0.006 (-0.78)
<i>chg_rd_ratio</i>	?	-0.313 (-0.13)	0.130 (0.05)			-0.515 (-0.22)	-0.511 (-0.22)
<i>chg_capex_ratio</i>	?	-4.790* (-1.69)	-4.520 (-1.54)			-4.247 (-1.38)	-4.016 (-1.25)
<i>l_zscore</i>	+			<b>0.014</b> (0.48)		<b>0.047</b> (1.60)	
<i>l_debt_serv</i>	+				<b>0.000</b> (1.19)		<b>-0.000</b> (-0.28)
<i>l_ROA</i>	?			0.714 (0.72)	1.058 (1.24)	1.328 (1.20)	0.856 (0.88)
<i>l_mtb</i>	?			0.000 (0.51)	0.000 (0.44)	0.006 (0.73)	0.006 (0.81)
<i>l_rd_ratio</i>	?			-1.110 (-0.58)	-0.495 (-0.25)	-0.946 (-0.46)	0.250 (0.12)
<i>l_capex_ratio</i>	?			-3.500** (-2.18)	-3.014* (-1.88)	-2.974* (-1.73)	-2.200 (-1.29)
<i>Constant</i>		-0.636*** (-2.60)	-0.635*** (-2.61)	-0.573* (-1.94)	-0.714** (-2.42)	-0.614** (-1.99)	-0.761** (-2.45)
Observations		375	368	386	386	375	368
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared		0.0351	0.0414	0.0383	0.0371	0.0483	0.0489

This table evaluates the decision to appoint a CEO with narcissistic traits using a probit model. The dependent variable takes a value of one if the appointed individual has a high score for narcissism, that is, the standardized binary picture and speech scores both equal 1, and zero otherwise. The independent variables are presented either as change variables, measured as the change from t-2 to t-1 or as prior year levels (t-1). Robust z-statistics are presented in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in detail in Appendix A.

or the debt-service ratio (*debt\_serv*). Given the literature's mixed results on narcissism and performance, I make no directional prediction for the coefficient on *Narcissism* itself.

If narcissists perform better in conditions of financial distress, I expect to see a positive relationship between *Narcissism\*Distress* and future performance as H2 predicts, which would mean a positive and significant coefficient for the interaction of Narcissism and *zscore* or *debt\_serv* (given they are measured such that a larger value conveys greater distress).

Results for Equation (2) are presented in Table 6. Panel A shows results for the regressions with the change in performance as the dependent variable. Panel B shows regressions with the aggregate future performance as the dependent variable. I find a positive and significant coefficient on *nar\_sum* in all three regressions of Panel A and in two of the three regressions in Panel B. Though I do not specifically make a prediction on the relationship between the narcissism measure and future firm performance, these results are consistent with Olsen et al. (2014), in that an individual with a high narcissism score would benefit the short-term performance of the firm. The distress variables, *zscore* and *debt\_serv*, both have negative and significant coefficients in Panel A, and *zscore* has a negative and significant coefficient in Panel B, indicating that higher levels of distress are negatively related to future firm performance, as one might expect. The variable of interest for H2 is the interaction of the narcissism score of a new CEO and distress of a firm. H2 predicts that a narcissist's performance is affected by the level of distress of a firm. When narcissism is interacted with the distress variable (columns 2 and 3 in both panels), the signs on the interaction term coefficients are not statistically significant.

**Table 6**  
**OLS Regression of Performance on Narcissism and Distress**

**Panel A: Change in Performance**

VARIABLES	Pred	(1) <i>chg_ROA</i>	(2) <i>chg_ROA</i>	(3) <i>chg_ROA</i>
<i>nar_sum</i>	?	0.012** (2.31)	0.021** (2.15)	0.010* (1.95)
<i>Zscore</i>	-		-0.024*** (-5.72)	
<i>debt_serv</i>	-			-0.000*** (-2.88)
<i>nar_sum * zscore</i>	+		<b>0.004</b> <b>(1.58)</b>	
<i>nar_sum * debtserv</i>	+			<b>-0.000</b> <b>(-0.60)</b>
<i>lnat</i>	?	-0.008 (-1.10)	0.001 (0.27)	-0.000 (-0.04)
<i>mtb</i>	?	0.007** (2.10)	0.003 (1.25)	0.004 (1.53)
<i>levg</i>	?	0.083 (1.51)	0.215*** (8.09)	0.097* (1.92)
<i>Constant</i>		0.182*** (3.36)	-0.028 (-0.59)	0.134*** (2.69)
Observations		422	400	399
R-squared		0.11	0.38	0.12
Industry FE		Yes	Yes	Yes
Year FE		Yes	Yes	Yes

**Panel B: Aggregate Future Performance**

VARIABLES	Pred	(1) <i>agg_ROA</i>	(2) <i>agg_ROA</i>	(3) <i>agg_ROA</i>
<i>nar_sum</i>	?	0.008* (1.78)	0.019** (2.10)	0.004 (1.05)
<i>zscore</i>	-		-0.023*** (-5.29)	
<i>debt_serv</i>	-			-0.000 (-1.41)
<i>nar_sum * zscore</i>	+		<b>0.004</b> <b>(1.53)</b>	
<i>nar_sum * debtserv</i>	+			<b>-0.000</b> <b>(-1.28)</b>

<i>l_ROA</i>	+	1.559*** (8.83)	1.094*** (6.59)	1.579*** (9.98)
<i>lnat</i>	?	-0.003 (-0.60)	0.001 (0.30)	0.001 (0.15)
<i>mtb</i>	?	0.003 (1.24)	0.003 (1.09)	0.001 (0.58)
<i>levg</i>	?	0.066 (1.57)	0.203*** (6.34)	0.068* (1.71)
<i>Constant</i>		0.061 (1.14)	-0.034 (-0.75)	0.033 (0.60)
Observations		422	400	399
R-squared		0.63	0.69	0.60
Industry FE		Yes	Yes	Yes
Year FE		Yes	Yes	Yes

This table presents OLS regression results for the effect of narcissism and distress on performance improvement (Panel A) or on future aggregate performance (Panel B). Aggregate performance is measured as the sum of EBITDA in years t+1, and t+2, divided by average total assets for those years. The change in performance is measured as the aggregate performance minus ROA in year t-1, where year t is the year of appointment. Robust t-statistics are in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix A.

Thus, the results in Table 6 suggest that the impact of narcissism on firm performance is not affected by firm financial distress, as posited by H2.

### ***Post-Appointment Performance and Visibility***

H3 predicts that the visibility of the firm, or the opportunity for self-enhancement, will affect the relationship between appointing a CEO with narcissistic tendencies and future firm performance. I follow prior literature and proxy for a firm's "visibility" or "opportunity for self-enhancement" with the number of media-mentions for a firm in the quarter following the quarter of appointment of the CEO (*media\_post*) (Frederickson and Zolotoy 2016; Bushee and Miller 2012). To test hypothesis 3, I split the sample into two groups—high visibility and low visibility firms. The *hi\_media* variable, by which the sample is divided, is set equal to one if the *media\_post* value of the firm is in the top half



of the sample (or greater than the median), indicating higher visibility, and zero otherwise. I run the same regression in Equation (2) for each separate group.

Splitting the regressions into the two groups allows us to see the differential effect of the variable of interest (*Narcissism \* Distress*) for each group. While a 3-way interaction between narcissism, distress, and visibility in one regression would do the same, splitting the sample allows easier interpretation of the coefficients and allows us to see how the coefficients for the control variables differ between the two groups. H3 predicts that the effect of narcissism on performance under financial distress would be stronger when visibility becomes a factor, and thus I expect the coefficient on the interaction term to be negative and significant for the group of high visibility firms, but not necessarily for the low visibility firms.

Table 7 presents results for the tests of hypothesis 3. Panel A presents results for the regressions using the change in future performance as the dependent variable, and Panel B shows the regressions with the aggregate future performance measure as the dependent variable. Columns 1 to 3 in both panels are the regressions for the high-visibility firms and columns 4 to 6 are the regressions for low visibility firms. First, looking at the regressions with only narcissism as the independent variable of interest (columns 1 and 4), narcissism does not, on its own, significantly affect firm performance. When distress variables are added, however, we see a positive and significant coefficient on *nar\_sum* for low visibility firms in columns 4 and 5 of Panel A, and column 5 of Panel B, suggesting firm distress levels have differential effects on a narcissist's performance for the two types of firms. H3 predicts a positive and significant coefficient on the interaction term, *nar\_sum\*distress*, for the high visibility firms, but not necessarily for

**Table 7**  
**OLS Regression of Performance on Narcissism and Distress by Visibility**

<b>Panel A: Change in Performance</b>							
		High Visibility			Low Visibility		
VARIABLES	Pred	(1) <i>chg_ROA</i>	(2) <i>chg_ROA</i>	(3) <i>chg_ROA</i>	(4) <i>chg_ROA</i>	(5) <i>chg_ROA</i>	(6) <i>chg_ROA</i>
<i>nar_sum</i>	?	0.006 (1.22)	0.003 (0.23)	0.004 (0.80)	0.013 (1.58)	0.033*** (3.06)	0.016* (1.87)
<i>zscore</i>	-		-0.025*** (-2.98)			-0.019*** (-5.01)	
<i>debt_serv</i>	-			-0.000** (-2.26)			0.000 (1.01)
<i>nar_sum * zscore</i>	+		<b>-0.001</b> <b>(-0.32)</b>			<b>0.007***</b> <b>(2.70)</b>	
<i>nar_sum * debtserv</i>	+			<b>-0.000</b> <b>(-1.06)</b>			<b>0.000*</b> <b>(1.94)</b>
<i>lnat</i>	?	-0.011 (-1.01)	-0.002 (-0.23)	0.000 (0.08)	0.007 (0.41)	0.006 (0.56)	0.015 (0.75)
<i>mtb</i>	?	0.010** (2.06)	0.007* (1.72)	0.006* (1.75)	0.004 (1.15)	0.000 (0.11)	0.001 (0.35)
<i>levg</i>	?	0.134* (1.65)	0.235*** (3.27)	0.159** (2.10)	0.071 (0.89)	0.202*** (9.46)	0.082 (1.09)
<i>Constant</i>		0.176* (1.83)	-0.028 (-0.36)	0.093 (1.50)	0.121 (1.00)	-0.016 (-0.18)	0.087 (0.64)
Observations		230	216	221	191	183	177
R-squared		0.17	0.31	0.19	0.18	0.58	0.22
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes	Yes

<b>Panel B: Future Aggregate Performance</b>							
		High Visibility			Low Visibility		
VARIABLES	Pred	(1) <i>agg_ROA</i>	(2) <i>agg_ROA</i>	(3) <i>agg_ROA</i>	(4) <i>agg_ROA</i>	(5) <i>agg_ROA</i>	(6) <i>agg_ROA</i>
<i>nar_sum</i>	?	0.004 (0.83)	-0.000 (-0.00)	0.002 (0.43)	0.009 (1.36)	0.033*** (3.04)	0.007 (1.10)
<i>zscore</i>	-		-0.021*** (-2.74)			-0.019*** (-4.44)	
<i>debt_serv</i>	-			-0.000* (-1.83)			0.000 (1.31)
<i>nar_sum * zscore</i>	+		<b>-0.002</b> <b>(-0.51)</b>			<b>0.007***</b> <b>(2.78)</b>	
<i>nar_sum * debtserv</i>	+			<b>-0.000</b> <b>(-1.32)</b>			<b>0.000</b> <b>(1.15)</b>

<i>l_ROA</i>	+	1.460*** (5.79)	1.190*** (5.88)	1.288*** (7.55)	1.660*** (6.68)	1.024*** (4.06)	1.856*** (9.25)
<i>lnat</i>	?	-0.002 (-0.27)	0.000 (0.05)	0.003 (0.63)	0.012 (0.74)	0.006 (0.59)	0.010 (0.60)
<i>mtb</i>	?	0.006* (1.70)	0.006 (1.54)	0.004 (1.26)	0.001 (0.21)	0.000 (0.07)	-0.002 (-0.79)
<i>levg</i>	?	0.131* (1.92)	0.213*** (3.05)	0.151** (2.21)	0.046 (0.79)	0.199*** (5.32)	0.033 (0.63)
<i>Constant</i>		0.031 (0.47)	-0.053 (-0.73)	0.022 (0.36)	-0.034 (-0.30)	-0.019 (-0.22)	-0.038 (-0.31)
Observations		230	216	221	191	183	177
R-squared		0.59	0.62	0.53	0.73	0.81	0.77
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes	Yes

This table presents OLS regression results for the effect of narcissism and distress on performance improvement (Panel A) or on future aggregate performance (Panel B) for two groups: high visibility and low visibility firms. Aggregate performance is measured as the sum of EBITDA in years t+1, and t+2, divided by average total assets for those years. The change in performance is measured as the aggregate performance minus ROA in year t-1. High visibility takes a value of 1 if the firm's *media\_post* score is above the median, and zero otherwise. Robust t-statistics are in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix A.

the low-visibility firms, given that these firms may not offer the opportunity for self-enhancement a narcissist seeks. The results in Table 7 show results opposite of what H3 predicts. The coefficient on the interaction term is positive and significant only for the low-visibility firms (columns 5 and 6 of Panel A, and column 5 of Panel B).

One possible, ex-post explanation for the counterintuitive results in Table 7 can be attributed to task difficulty and visibility being counteracting forces on the performance of a narcissistic CEO. If a firm is highly visible, a narcissistic individual may be too focused on the publicity aspect of the job—where the importance of fulfilling the vanity aspect of narcissism, that is, wanting to be in the spotlight, outweighs the importance of tackling the difficult task at hand. In a low-visibility firm, the opportunity for self-enhancement is not there, and thus, the CEO can focus his or her efforts on the firm, where some of the positive qualities of a narcissistic individual will come through

for the firm in distress. Overall, the results in Table 7 partially support hypothesis 2, but show evidence that contradicts what hypothesis 3 predicts.

## CHAPTER V

### ADDITIONAL ANALYSES

The tests in section IV were all conducted using the combined measure of narcissism for the reasons discussed above. In this section, I report results for the same tests using the individual measures of narcissism—the picture score and the speech score. First, conducting the tests with only one of the measures per regression allows for a larger sample, increasing the tests’ power. There are 684 observations with a picture score available and 824 observations with a speech measure available, compared to 549 observations that have both. Second, running the same tests with each individual measure allows us to see whether one aspect of the combined measure is driving the primary results.

Tables 8-10 replicate Tables 5-7, but use each of the individual measures of narcissism. Table 8 reports the results for the probit regression model to test hypothesis 1. Panel A reports the results using only the picture binary measure (*pic\_bin*) and Panel B reports the results using the speech measure of narcissism (*speech\_bin*). In both panels, the variables of interest—the change in z-score and debt-service ratio and the prior year levels of each—are not significant. Together, Panels A and B of this table tell us that it is not only one of the individual measures of narcissism that drives the results in Table 5 and that the two individual measures reflect different elements of narcissism.

Table 9 presents results for the OLS regression of future firm performance, as measured by the change in ROA (Panel A) or aggregate ROA (Panel B), on the interaction of narcissism and distress, where narcissism is measured either by the picture

**Table 8**  
**Probit Regression for Appointment Decision (Individual Measures)**

<b>Panel A: Probit Regression Using Picture Measure of Narcissism</b>							
VARIABLES	Pred	(1) <i>pic_bin</i>	(2) <i>pic_bin</i>	(3) <i>pic_bin</i>	(4) <i>pic_bin</i>	(5) <i>pic_bin</i>	(6) <i>pic_bin</i>
<i>chg_zscore</i>	+	<b>0.009</b> <b>(0.43)</b>				<b>0.016</b> <b>(0.68)</b>	
<i>chg_debt_serv</i>	+		<b>-0.000</b> <b>(-0.52)</b>				<b>-0.000</b> <b>(-0.65)</b>
<i>chg_ROA</i>	?	-1.365 (-1.31)	-1.360 (-1.30)			-1.643 (-1.46)	-1.680 (-1.55)
<i>chg_mtb</i>	?	-0.002 (-1.52)	-0.002 (-1.54)			0.004 (0.78)	0.004 (0.74)
<i>chg_rd_ratio</i>	?	-0.848 (-0.49)	-0.798 (-0.45)			-1.743 (-1.09)	-1.935 (-1.21)
<i>chg_capex_ratio</i>	?	1.958 (0.89)	2.657 (1.06)			2.134 (0.93)	2.389 (0.92)
<i>l_zscore</i>	+			<b>-0.004</b> <b>(-0.21)</b>		<b>0.006</b> <b>(0.30)</b>	
<i>l_debt_serv</i>	+				<b>-0.000</b> <b>(-0.38)</b>		<b>0.000</b> <b>(0.46)</b>
<i>l_ROA</i>	?			0.781 (1.02)	1.382** (2.04)	1.674* (1.95)	1.998*** (2.68)
<i>l_mtb</i>	?			-0.002 (-1.35)	-0.002 (-1.37)	-0.006 (-1.11)	-0.006 (-1.06)
<i>l_rd_ratio</i>	?			-1.352 (-0.84)	-1.426 (-0.84)	-0.924 (-0.53)	-0.589 (-0.31)
<i>l_capex_ratio</i>	?			0.245 (0.20)	0.411 (0.32)	-1.077 (-0.80)	-0.494 (-0.37)
<i>Constant</i>		0.231 (1.12)	0.233 (1.13)	0.105 (0.43)	0.001 (0.00)	0.034 (0.14)	-0.071 (-0.28)
Observations		487	478	501	503	487	478
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared		0.0421	0.0360	0.0386	0.0387	0.0492	0.0460

Panel B: Probit Regression Using Speech Measure of Narcissism							
		(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Pred	<i>speech_ bin</i>	<i>speech_ bin</i>	<i>speech_ bin</i>	<i>speech_ bin</i>	<i>speech_ bin</i>	<i>speech_ bin</i>
<i>chg_zscore</i>	+	<b>-0.005</b> <b>(-0.29)</b>				<b>-0.000</b> <b>(-0.02)</b>	
<i>chg_debt_serv</i>	+		<b>-0.000</b> <b>(-1.63)</b>				<b>-0.000</b> <b>(-1.23)</b>
<i>chg_ROA</i>	?	0.355 (0.58)	0.392 (0.67)			0.673 (0.97)	0.564 (0.88)
<i>chg_mtb</i>	?	-0.000 (-0.07)	-0.000 (-0.01)			-0.004 (-0.81)	-0.004 (-0.71)
<i>chg_rd_ratio</i>	?	1.682 (1.13)	1.593 (1.04)			1.998 (1.26)	1.673 (1.07)
<i>chg_capex_ratio</i>	?	-1.316 (-0.69)	-2.279 (-1.15)			-0.986 (-0.49)	-1.852 (-0.88)
<i>l_zscore</i>	+			<b>-0.001</b> <b>(-0.06)</b>		<b>-0.004</b> <b>(-0.28)</b>	
<i>l_debt_serv</i>	+				<b>-0.000</b> <b>(-1.09)</b>		<b>0.000</b> <b>(0.56)</b>
<i>l_ROA</i>	?			0.216 (0.36)	0.398 (0.71)	-0.051 (-0.08)	0.286 (0.50)
<i>l_mtb</i>	?			0.001 (0.63)	0.001 (0.62)	0.005 (0.86)	0.004 (0.76)
<i>l_rd_ratio</i>	?			-0.759 (-0.71)	-0.518 (-0.46)	-1.329 (-1.19)	-0.801 (-0.70)
<i>l_capex_ratio</i>	?			-1.234 (-1.12)	-1.533 (-1.36)	-0.721 (-0.60)	-0.995 (-0.82)
<i>Constant</i>		-0.309* (-1.67)	-0.309* (-1.67)	-0.310 (-1.51)	-0.327 (-1.58)	-0.300 (-1.44)	-0.329 (-1.57)
Observations		655	631	675	665	655	631
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared		0.0137	0.0148	0.0144	0.0148	0.0164	0.0171

This table evaluates the decision to appoint a CEO with narcissistic traits using a probit model. The dependent variable takes a value of one if the appointed CEO's photo score is greater than or equal to 3, and zero otherwise (Panel A, *pic\_bin*) or takes a value of one if the appointed CEO's pronoun ratio score is greater than the mean, and zero otherwise (Panel B, *speech\_bin*). The independent variables are presented either as change variables, measured as the change from t-2 to t-1 or as prior year levels (t-1). Robust z-statistics are presented in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in detail in Appendix A.

score (*pic\_avg*) or the speech score (*pnoun\_ratio*) and distress is measured either with a firm's z-score or debt-service ratio. In Panel A, columns 1 and 3 show a positive and significant coefficient on *pic\_avg*, whereas only column 5 shows significance on the

**Table 9**  
**OLS Regression of Performance on Narcissism and Distress (Individual Measures)**

<b>Panel A: Change in Performance</b>							
VARIABLES	Pred Sign	Picture Measure			Speech Measure		
		(1) <i>chg_ROA</i>	(2) <i>chg_ROA</i>	(3) <i>chg_ROA</i>	(4) <i>chg_ROA</i>	(5) <i>chg_ROA</i>	(6) <i>chg_ROA</i>
<i>pic_avg</i>	?	0.020*** (2.96)	0.020 (1.38)	0.014** (2.22)			
<i>pnoun_ratio</i>	?				0.057 (0.98)	0.364*** (2.71)	0.030 (0.51)
<i>zscore</i>	-		-0.027*** (-3.03)			-0.043*** (-4.30)	
<i>debt_serv</i>	-			-0.000 (-0.20)			0.000 (0.34)
<i>pic_avg * zscore</i>	+		<b>0.003</b> <b>(0.78)</b>				
<i>pic_avg * debtserv</i>	+			<b>-0.000</b> <b>(-0.29)</b>			
<i>pnoun_ratio * zscore</i>	+					<b>0.104***</b> <b>(3.21)</b>	
<i>pnoun_ratio * debtserv</i>	+						<b>-0.000</b> <b>(-0.66)</b>
<i>lnat</i>	?	-0.009 (-1.48)	0.001 (0.28)	-0.001 (-0.21)	0.005 (0.73)	0.008 (1.51)	0.010 (1.47)
<i>mtb</i>	?	0.005* (1.81)	0.002 (0.84)	0.002 (1.11)	0.007** (2.34)	0.004 (1.56)	0.006* (1.89)
<i>levg</i>	?	0.078 (1.61)	0.197*** (7.15)	0.100** (2.25)	0.049 (0.88)	0.169*** (3.72)	0.073 (1.32)
<i>Constant</i>		0.151*** (2.99)	-0.039 (-0.61)	0.108** (2.12)	0.047 (0.78)	-0.148** (-1.97)	0.020 (0.32)
Observations		539	509	509	698	665	652
R-squared		0.10	0.30	0.11	0.08	0.25	0.09
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes	Yes

<b>Panel B: Aggregate Future Performance</b>							
VARIABLES	Pred Sign	Picture Measure			Speech Measure		
		(1) <i>agg_ROA</i>	(2) <i>agg_ROA</i>	(3) <i>agg_ROA</i>	(4) <i>agg_ROA</i>	(5) <i>agg_ROA</i>	(6) <i>agg_ROA</i>
<i>pic_avg</i>	?	0.014** (2.19)	0.018 (1.31)	0.007 (1.22)			
<i>pnoun_ratio</i>	?				0.045 (0.88)	0.319** (2.45)	0.005 (0.10)
<i>zscore</i>	-		- 0.025***			-0.037***	



<i>debt_serv</i>	-		(-2.87)			(-3.59)	
				0.000			0.000
				(0.49)			(0.82)
<i>pic_avg * zscore</i>	+		<b>0.003</b>				
			<b>(0.74)</b>				
<i>pic_avg * debtserv</i>	+			<b>-0.000</b>			
				<b>(-0.91)</b>			
<i>pnoun_ratio * zscore</i>	+				<b>0.092***</b>		
					<b>(2.94)</b>		
<i>pnoun_ratio * debtserv</i>	+					<b>-0.000</b>	
						<b>(-1.00)</b>	
<i>l_ROA</i>	+	1.476***	1.107***	1.441***	1.501***	1.220***	1.489***
		(9.32)	(7.19)	(9.80)	(12.39)	(9.75)	(13.43)
<i>lnat</i>	?	-0.007	0.001	-0.001	0.002	0.006	0.005
		(-1.25)	(0.24)	(-0.27)	(0.38)	(1.19)	(0.98)
<i>mtb</i>	?	0.002	0.001	0.001	0.004	0.003	0.003
		(0.97)	(0.67)	(0.37)	(1.41)	(1.25)	(1.11)
<i>levg</i>	?	0.068*	0.186***	0.080**	0.067*	0.156***	0.081**
		(1.79)	(5.85)	(2.17)	(1.96)	(3.72)	(2.42)
<i>Constant</i>		0.070	-0.042	0.054	0.003	-0.137*	-0.009
		(1.30)	(-0.67)	(0.97)	(0.05)	(-1.82)	(-0.15)
Observations		539	509	509	698	665	652
R-squared		0.58	0.62	0.55	0.56	0.60	0.55
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes	Yes

This table presents OLS regression results for the effect of narcissism (as measured by picture score or speech score) and distress on performance improvement (Panel A) or on future aggregate performance (Panel B). Aggregate performance is measured as the sum of EBITDA in years t+1, and t+2, divided by average total assets for those years. The change in performance is measured as the aggregate performance minus ROA in year t-1, where year t is the year of appointment. Robust t-statistics are in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix A.

coefficient on *pnoun\_ratio*, indicating that in the case of looking only at the narcissism score coefficient, the picture score could be the primary driver for the effect of narcissism on the change in performance. When looking at the interaction terms, the z-score measure interacted with the speech score has a positive and significant coefficient (columns 5), and neither variable of interest has a significant coefficient picture score regressions (columns 2 and 3). Thus, results in Panel A show weak evidence that a high-narcissism-scoring CEO will improve the performance of firms in distress. Panel B results are consistent with Panel A in that the coefficient for the interaction term using the speech

measure of narcissism and *zscore* is positive and significant, but no other variable of interest is significant. These results show that the speech measure of narcissism potentially carries more weight when looking at the effect of narcissism on firm performance, but these results (together with those in Table 8) suggest that neither the picture alone nor the speech measure alone capture the essence of narcissism as a whole.

Table 10 replicates the tests conducted in Table 7 using the individual measures of narcissism. In these tests, I examine whether the effect of narcissism and distress on future firm performance varies by the opportunity for self-enhancement, as proxied by firm visibility. Panels A and B show regressions where the change in ROA is the dependent variable. Panels C and D show regressions where the aggregate future ROA is the dependent variable. The results in Table 10 are generally consistent with, but weaker than, Table 7 results. The interaction terms using the z-score measure have positive and significant coefficients in the low visibility firms, but only in the regressions using the speech measure of narcissism, suggesting that results in Table 7 are primarily driven by the speech measure of narcissism. Altogether, the mixed results in Tables 8-10 for the individual measures of narcissism (picture score and speech score) further suggest that a combined measure of narcissism is the best for capturing the whole of what could be a narcissistic individual, and thus, is most appropriate for the tests of the hypotheses above.

**Table 10**  
**OLS Regression of Performance on Narcissism and Distress by Visibility**

**Panel A: Change in Performance Using Picture Measure of Narcissism**

VARIABLES	Pred Sign	High Visibility			Low Visibility		
		(1) <i>chg_ROA</i>	(2) <i>chg_ROA</i>	(3) <i>chg_ROA</i>	(4) <i>chg_ROA</i>	(5) <i>chg_ROA</i>	(6) <i>chg_ROA</i>
<i>pic_avg</i>	?	0.017* (1.92)	0.010 (0.78)	0.009 (1.12)	0.022** (2.32)	0.014 (0.70)	0.023*** (2.69)
<i>zscore</i>	-		-0.013 (-1.24)			-0.027** (-2.56)	
<i>debt_serv</i>	-			0.000 (0.50)			-0.000* (-1.75)
<i>pic_avg * zscore</i>	+		<b>-0.001</b> <b>(-0.19)</b>			<b>0.001</b> <b>(0.24)</b>	
<i>pic_avg * debtserv</i>	+			<b>-0.000</b> <b>(-0.91)</b>			<b>0.000</b> <b>(1.44)</b>
<i>lnat</i>	?	-0.009 (-1.06)	0.006 (0.84)	0.001 (0.24)	-0.010 (-0.67)	-0.002 (-0.16)	0.000 (0.00)
<i>mtb</i>	?	0.007* (1.92)	0.004 (1.57)	0.004 (1.57)	0.002 (0.50)	-0.001 (-0.47)	-0.001 (-0.19)
<i>levg</i>	?	0.132** (2.03)	0.222*** (3.51)	0.162*** (2.61)	0.060 (0.80)	0.194*** (7.41)	0.075 (1.07)
<i>Constant</i>		0.132 (1.61)	-0.052 (-0.74)	0.063 (0.97)	0.187* (1.76)	-0.018 (-0.17)	0.123 (1.03)
Observations		290	272	277	248	236	231
R-squared		0.14	0.24	0.16	0.14	0.43	0.18
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes	Yes

**Panel B: Change in Performance Using Speech Measure of Narcissism**

VARIABLES	Pred Sign	High Visibility			Low Visibility		
		(1) <i>chg_ROA</i>	(2) <i>chg_ROA</i>	(3) <i>chg_ROA</i>	(4) <i>chg_ROA</i>	(5) <i>chg_ROA</i>	(6) <i>chg_ROA</i>
<i>pnoun_ratio</i>	?	0.026 (0.41)	0.203 (1.27)	0.012 (0.20)	0.087 (0.79)	0.291** (2.17)	0.050 (0.40)
<i>zscore</i>	-		-0.021 (-1.35)			-0.049*** (-4.93)	
<i>debt_serv</i>	-			0.000 (0.83)			-0.000 (-0.51)
<i>pnoun_ratio * zscore</i>	+		<b>0.056</b> <b>(1.19)</b>			<b>0.087***</b> <b>(3.28)</b>	
<i>pnoun_ratio * debtserv</i>	+			<b>-0.001</b> <b>(-1.12)</b>			<b>0.000</b> <b>(0.30)</b>
<i>lnat</i>	?	-0.006 (-0.80)	0.000 (0.00)	-0.001 (-0.12)	0.033** (2.01)	0.022** (1.99)	0.043** (2.47)

<i>mtb</i>	?	0.005* (1.91)	0.004** (1.97)	0.003* (1.77)	0.010* (1.79)	0.004 (0.75)	0.008 (1.45)
<i>levg</i>	?	0.092 (1.61)	0.148** (2.41)	0.117** (2.13)	0.036 (0.43)	0.226*** (5.92)	0.063 (0.78)
<i>Constant</i>		0.151** (2.02)	0.020 (0.24)	0.109* (1.90)	-0.137 (-1.11)	-0.290*** (-2.68)	-0.194 (-1.41)
Observations		364	347	341	333	317	310
R-squared		0.11	0.15	0.13	0.15	0.43	0.17
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes	Yes

**Panel C: Future Aggregate Performance Using Picture Measure of Narcissism**

VARIABLES	Pred Sign	High Visibility			Low Visibility		
		(1) <i>agg_ROA</i>	(2) <i>agg_ROA</i>	(3) <i>agg_ROA</i>	(4) <i>agg_ROA</i>	(5) <i>agg_ROA</i>	(6) <i>agg_ROA</i>
<i>pic_avg</i>	?	0.013 (1.57)	0.007 (0.52)	0.007 (0.88)	0.018** (2.12)	0.014 (0.71)	0.016* (1.89)
<i>zscore</i>	-		-0.009 (-0.87)			-0.026** (-2.54)	
<i>debt_serv</i>	-			0.000 (0.67)			-0.000 (-0.90)
<i>pic_avg * zscore</i>	+		<b>-0.002</b> <b>(-0.37)</b>			<b>0.001</b> <b>(0.24)</b>	
<i>pic_avg * debtserv</i>	+			<b>-0.000</b> <b>(-1.05)</b>			<b>0.000</b> <b>(1.11)</b>
<i>l_ROA</i>	+	1.374*** (5.89)	1.186*** (5.65)	<b>1.190***</b> <b>(7.59)</b>	<b>1.581***</b> <b>(6.80)</b>	<b>1.056***</b> <b>(4.36)</b>	<b>1.711***</b> <b>(8.50)</b>
<i>lnat</i>	?	-0.003 (-0.59)	0.007 (1.13)	0.003 (0.56)	-0.011 (-0.74)	-0.002 (-0.19)	-0.009 (-0.57)
<i>mtb</i>	?	0.005* (1.80)	0.004 (1.48)	0.003 (1.34)	-0.001 (-0.34)	-0.001 (-0.49)	-0.003 (-0.96)
<i>levg</i>	?	0.131** (2.23)	0.207*** (3.27)	0.157*** (2.65)	0.041 (0.73)	0.187*** (4.68)	0.036 (0.70)
<i>Constant</i>		0.028 (0.44)	-0.074 (-1.10)	0.022 (0.35)	0.089 (0.84)	-0.020 (-0.18)	0.069 (0.59)
Observations		290	272	277	248	236	231
R-squared		0.55	0.58	0.49	0.65	0.70	0.67
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes	Yes

**Panel D: Future Aggregate Performance Using Speech Measure of Narcissism**

VARIABLES	Pred Sign	High Visibility			Low Visibility		
		(1) <i>agg_ROA</i>	(2) <i>agg_ROA</i>	(3) <i>agg_ROA</i>	(4) <i>agg_ROA</i>	(5) <i>agg_ROA</i>	(6) <i>agg_ROA</i>
<i>pnoun_ratio</i>	?	0.025 (0.43)	0.136 (1.04)	0.007 (0.12)	0.053 (0.57)	0.289** (2.09)	-0.017 (-0.17)

<i>zscore</i>	-		-0.014 (-1.14)			-0.049*** (-4.42)	
<i>debt_serv</i>	-			0.000 (0.99)			0.000 (0.32)
<i>pnoun_ratio</i> * <i>zscore</i>	+		<b>0.037</b> <b>(1.01)</b>			<b>0.086***</b> <b>(3.19)</b>	
<i>pnoun_ratio</i> * <i>debt_serv</i>	+			<b>-0.001</b> <b>(-1.23)</b>			<b>-0.000</b> <b>(-0.34)</b>
<i>l_ROA</i>	+	1.345*** (7.24)	1.271*** (7.49)	<b>1.184***</b> <b>(9.66)</b>	<b>1.582***</b> <b>(10.00)</b>	<b>1.015***</b> <b>(6.24)</b>	<b>1.661***</b> <b>(12.35)</b>
<i>lnat</i>	?	-0.004 (-0.62)	-0.000 (-0.01)	-0.001 (-0.11)	0.023 (1.64)	0.022* (1.87)	0.027* (1.84)
<i>mtb</i>	?	0.004 (1.61)	0.003 (1.60)	0.003 (1.38)	0.005 (1.02)	0.004 (0.74)	0.004 (0.76)
<i>levg</i>	?	0.101** (2.03)	0.133** (2.40)	0.117** (2.25)	0.060 (1.32)	0.225*** (5.13)	0.079** (1.97)
<i>Constant</i>		0.078 (1.35)	0.010 (0.13)	0.080 (1.40)	-0.124 (-1.13)	-0.289** (-2.55)	-0.134 (-1.16)
Observations		364	347	341	333	317	310
R-squared		0.53	0.52	0.48	0.62	0.70	0.64
Industry FE		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes	Yes

This table presents OLS regression results for the effect of narcissism (as measured by either picture score or speech score) and distress on performance improvement (Panels A and B) or on future aggregate performance (Panels C and D) for two groups: high visibility and low visibility firms. Aggregate performance is measured as the sum of EBITDA in years t+1, and t+2, divided by average total assets for those years. The change in performance is measured as the aggregate performance minus ROA in year t-1. High visibility takes a value of 1 if the firm's *media\_post* score is above the median, and zero otherwise. Robust t-statistics are in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix A.

## **CHAPTER VI**

### **CONCLUSION**

In this study, I find modest evidence to support the hypothesis that firms which are approaching financial distress, that is, firms with decreasing debt-service ratios (increasing distress) in the years leading up to turnover are more likely to hire a narcissistic CEO. The lack of results for the z-score measure of distress may suggest that the measures of distress are capturing different elements of a firm's financial health, which is consistent with the literature examining these distress measures. Further, I examine the future performance of the turnover firms. I find evidence that firms under distress that appoint a CEO with narcissistic traits experience improvement in future firm performance, but only if the firm is not a highly visible firm, suggesting a tradeoff between a narcissistic CEO's ability to perform in an environment of distress and uncertainty and his or her need for self-enhancement.

The literature has studied the relationship between narcissism and performance and has found both negative and positive effects of narcissistic executives on a firm. The psychology literature suggests that under certain conditions, such as chaotic and stressful environments, and conditions under which the narcissist's performance has high visibility, narcissists tend to thrive and outperform non-narcissists. Broadly, my paper contributes to the literature following upper echelon's theory, which highlights the importance of specific manager characteristics and their effects on firm outcomes. More specifically, my study adds to the empirical literature supporting Finkelstein et al.'s (2009) "fit-drift/shift-refit" theory by examining whether firms under financial distress are more likely to appoint a narcissist as CEO. Further, by establishing that different

characteristics of the firm affect the relationship between narcissism and firm performance, we can better understand the different outcomes that have been found in prior literature. If boards match newly appointed narcissists to their firm's current needs, but these CEOs become entrenched (as narcissists may tend to do) while the firm's needs drift or shift over time, then we can see how fit-drift/shift-refit theory would explain not only the appointment of narcissists under these specific contexts, but also why the literature shows positive as well as negative firm outcomes over a longer time period of time.

## APPENDIX

### VARIABLE DEFINITIONS

Variable	Definition
<b>Narcissism Measures</b>	
<i>nar_sum</i>	Sum of the standardized picture score ( <i>pic_avg</i> ) and speech score ( <i>pnoun_ratio</i> ).
<i>nar_bin</i>	Binary variable equal to 1 if both the standardized picture score and standardized speech score are greater than the mean of zero, and zero otherwise.
<i>pic_avg</i>	Average CEO's photo score for two annual reports. The two annual reports do not include the first annual report in which the new CEO appears. The photo score for each year is based on the following scale: (1) No photograph of the CEO is present; (2) The CEO is photographed with other executives, board members, or employees of the firm; (3) The CEO is photographed alone, and the photograph takes up less than half of the page; (4) The CEO is photographed alone, and the photograph takes up at least half of the page, with text taking up some space on the page; (5) The CEO is photographed alone, and the photograph takes up the entire page.
<i>pic_bin</i>	Binary variable equal to 1 if the CEO's photo score ( <i>pic_avg</i> ) is 3 or higher, and zero otherwise
<i>pnoun_ratio</i>	The ratio of singular personal pronouns (e.g., I, my, mine, etc.) to all personal pronouns (e.g., I, my, mine, we, our, ours, etc.) in the CEO's spoken portion of Q&A section of the firm's conference call transcript.
<i>speech_bin</i>	Binary variable equal to 1 if the CEO's speech score ( <i>pnoun_ratio</i> ) is higher than the mean, and zero otherwise.
<b>Distress Measures</b>	
<i>debt_serv</i>	Debt service ratio, measure of financial distress, calculated as the negative of ebitda/(total short term debt + interest); increases in financial distress.
<i>zscore</i>	Altman (1968) Z-score, measure of financial distress, calculated as the negative of $1.2 * (\text{working capital} / \text{total assets}) + 1.4 * (\text{retained earnings} / \text{total assets}) + 3.3 * (\text{ebit} / \text{total assets}) + 0.6 * (\text{market value of equity} / \text{total liabilities}) + 0.999 * (\text{sales} / \text{total assets})$ ; increases in financial distress.
<b>Visibility Measures</b>	
<i>media_post</i>	Number of firm media mentions in the quarter following the quarter in which the new CEO was appointed.
<i>media_pre</i>	Number of firm media mentions in the quarter preceding the quarter in which the new CEO was appointed.



<b>Performance and Control Variables</b>	
<i>agg_ROA</i>	Aggregate future ROA, calculated as $(ROA_{t+1} + ROA_{t+2})/[(at_{t+1} + at_{t+2})/2]$
<i>chg_ROA</i>	Change in ROA, calculated as <i>agg_ROA</i> minus $ROA_{t-1}$
<i>at</i>	Total assets.
<i>capex_ratio</i>	Capital expenditures ratio, calculated as capital expenditures/total assets.
<i>chg_variable</i>	Change of the variable from year t-2 to t-1.
<i>ebitda</i>	Earnings before interest, taxes, and depreciation; proxy for operating income.
<i>epspi</i>	Basic earnings per share, including extraordinary items.
<i>ib</i>	Income before extraordinary items.
<i>l_variable</i>	Lagged variable, t-1.
<i>levg</i>	Leverage, calculated as (total short term debt + total long term debt)/total assets.
<i>mkvalt</i>	Market value of equity.
<i>mtb</i>	Market to book ratio, calculated as <i>mkvalt</i> /book equity.
<i>rd_ratio</i>	Research and development ratio, calculated as R&D expenditures/total assets.
<i>ROA</i>	Return on assets, calculated as <i>ebitda</i> /total assets.

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